

U.S. PATENT APPLN. S.N. 09/524,575  
RESPONSE UNDER 37 C.F.R. § 1.111

**PATENT**

**REMARKS**

Claims 7, 26 and 29 have been amended to positively recite the in-line exhaust pipe of the system of the present invention for purification of exhaust gas from an internal combustion engine.

Claims 7-8, 11-12, 15, 17, 19, 21-22, 26 and 29-30 are rejected in the Action mailed November 16, 2004, as being unpatentable under 35 U.S.C. § 103(a) over WO 94/11623 in view of EP 661,098, EP 602,963 and JP 7-124468. The Office takes the position in this rejection that the "apparatus of WO 94/11623 is substantially the same as that instantly claimed, but fails to disclose whether the adsorbent may contain at least one catalyst component of noble metal" (Action, page 3, lines 5-7) and, more particularly, takes the position that WO 94/11623 discloses that in the system disclosed therein, the adsorbent and the catalyst are provided at an in-line exhaust pipe of an internal combustion engine (citing page 20, lines 8-19, and page 26, lines 9-14).

The position of the Office regarding the adsorbent and the catalyst being provided at an in-line exhaust pipe in WO 94/11623 is not correct because the system of WO 94/11623 cannot comprise an in-line exhaust pipe. In an in-line exhaust pipe, the exhaust gas flows sequentially through components provided in essentially a straight line. (See SAE Technical Paper Series 970266, 980423 and

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1999-01-1230, which have previously been made of record in the file of the present application).

WO 94/11623 describes on page 20, lines 8-10, that the first catalyst zone and second catalyst zone may each comprise discrete carrier monoliths and on page 26, lines 8-10, describes that the adsorbent zone should be positioned at a location in the engine exhaust system which is upstream of a hydrocarbon conversion catalyst. However, it is described in lines 10-12 on page 20 that heat exchange between the monoliths, i.e., between the first catalyst zone and second catalyst zone, is achieved by disposing the monoliths in heat exchange relation to one another.

Two monoliths disposed in heat exchange relation with one another cannot be positioned in an in-line exhaust pipe of an internal combustion engine as required by the claims. To be arranged in heat exchange relation with the first catalyst monolith, the second catalyst monolith must be arranged adjacent or close to the first catalyst monolith such that exhaust gas that passes through the first catalyst monolith and through the adsorbent zone is returned to the location of the first catalyst monolith. Such arrangement is not possible in an in-line exhaust pipe.

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If the Office maintains its position that the system of WO 94/11623 where the first and second catalyst zones comprise discrete monoliths in heat exchange relation to one another is within the scope of the claims of the present application, it is respectfully requested to explain how the monoliths could be physically provided in an in-line exhaust pipe in heat exchange relation to one another.

Since the crossflow-type system of WO 94/11623 is not substantially the same as that instantly claimed for the reasons explained above, the proposed modification of WO 94/11623 will not result in the system for purification of exhaust gas recited in the rejected claims.

Removal of the 35 U.S.C. § 103(a) rejection of the claims over WO 94/11623 in view of EP 661,098, EP 602,963 and JP 7-124468 is in order.

Claims 7-8, 11-12, 15, 17, 19, 21-22, 26 and 29-30 over rejected under 35 U.S.C. § 103(a) over EP 661,098 ("EP '098") in view of WO 94/11623. The position of the Office is that it would be obvious for a person of ordinary skill in the art to have used an H/beta-zeolite of WO 94/11623 having an  $\text{SiO}_2/\text{Al}_2\text{O}_3$  ratio ("SAR") of 100 or more as the adsorbent in the adsorbent-catalyst disclosed in EP '098.

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This rejection is not proper because obviousness requires, first, that the prior art teach or suggest or otherwise provide a motive for making the proposed modification and, second, that the art-skilled person be able to reasonably predict that the proposed modification will be successful. Both the suggestion or motive and the reasonable expectation of success are required and have not been shown by the Office to be supported in the prior art.

There is no teaching or suggestion in EP 661,098 and/or WO 94/11623 to make the proposed modification and a motive to make the proposed modification does not otherwise exist because the exhaust systems disclosed in the respective references are different in nature. The exhaust system disclosed in EP '098 is not a crossflow-type system as required in WO 94/11623.

Thus, the first requirement for supporting the 35 U.S.C. § 103(a) rejection is absent.

Also, the art-skilled person could not have reasonably predicted the results of using an H/beta-zeolite having an  $\text{SiO}_2/\text{Al}_2\text{O}_3$  ratio ("SAR") of 100 or more (as recited in claim 7) or an H/beta-zeolite having an  $\text{SiO}_2/\text{Al}_2\text{O}_3$  ratio ("SAR") of 200 or more (as recited in claim 29) as the adsorbent in the adsorbent-catalyst disclosed in EP '098 because the only zeolite used in the examples of the adsorbent-catalysts of EP '098 is ZSM-5. Nothing is

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described in EP '098 concerning the expected results of using an H/beta-zeolite as the adsorbent of the adsorbent-catalyst. WO 94/11623 discloses nothing concerning the use of any of the adsorbents described therein as the adsorbent of an adsorbent-catalyst as disclosed in EP '098 and thus provides no basis for predicting the results of using an H/beta-zeolite as the adsorbent of the adsorbent-catalyst of EP '098.

Moreover, the properties of an exhaust gas when treated with an adsorbent in an in-line exhaust pipe cannot be reasonably predicted from the results of treating an exhaust gas with the adsorbent in a looped system as disclosed in WO 94/11623 in which the exhaust gas is subjected to heat exchange before or during the time that the exhaust gas from the adsorbent zone is contacted with the catalyst in the second catalyst zone.

Thus, the second requirement for supporting the 35 U.S.C. § 103(a) rejection is also absent.

For these reasons, EP '098, taken alone or in combination with WO 94/11623, cannot support a case of prima facie obviousness of claims 7-8, 11-12, 15, 17, 19, 21-22, 26 and 29-30.

Claims 7-8, 11-12, 15, 17 and 29-30 are rejected under 35 U.S.C. § 103(a) over EP 602,963 ("EP '963") in view of WO 94/11623. This combination of references also fails to support a case of

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*prima facie* obviousness of the rejected claims for the same reasons as explained above relating to the rejection based on the combination of EP '098 and WO 94/11623.

The requisite teaching, suggestion or motive to make the modification proposed by the Office is lacking. Also, the person of ordinary skill in the art could not have reasonably predicted the results of the modification proposed by the Office. In this regard, it is noted that EP '963 discloses that the addition of an oxidative gas or the regulation of the amount of the combustion air and fuel is required. In view of such requirement, the requisite motive to combine EP '963 with the crossflow-type system of WO 94/11623 is lacking.

For these reasons, EP 602,963, taken alone or in combination with WO 94/11623, cannot support a case of *prima facie* obviousness of the claims.

Claoms 19, 21-22 and 26 are rejected under 35 U.S.C. § 103(a) over EP '963 in view of WO 94/11623 and further in view of EP '968.

The reasons explained above concerning the insufficiencies of the cited references, alone or in combination, to support a case of *prima facie* obviousness of the claims of the application and the lack of a proper motive to combine the cited references also apply to this rejection.

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Notwithstanding the insufficiencies of the prior art to support a *prima facie* case of obviousness of the claims of the application, submitted with this response is a declaration under 37 C.F.R. § 1.132 of Akira TAKAHASHI. The declaration is submitted to show that the system for purification of exhaust gas from an internal combustion engine of the present invention in which an adsorbent zone and a catalyst zone are positioned in an in-line exhaust pipe of an internal combustion engine with the adsorbent zone being upstream of the catalyst zone with respect to flow of said exhaust gas, and in which the adsorbent contains an H/ $\beta$ -zeolite having an  $\text{SiO}_2/\text{AlO}_3$  ratio of 100 or more and further contains at least one noble metal selected from Pt, Pd and Rh as a catalyst component, provides unexpected results as compared to the apparatus for treating engine exhaust gases of WO 94/11623 and, particularly, as compared to the apparatus for treating engine exhaust gas of Examples 2 and 3 of WO 94/11623, which includes first and second catalyst zones and an adsorbent zone between them, wherein the first and second catalyst zones are in heat transfer relation to one another via a crossflow monolith on which the catalysts are coated.

The declarant has accurately reproduced Examples 2 and 3 of WO 94/11623 to the extent possible in view of current availability of

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apparatus and test equipment used in the examples and differences between the "Additional Examples" described in the declaration and Examples 2 and 3 of WO 94/11623 are submitted by the applicants to be immaterial to the validity of the showing in the declaration.

The data of the declaration are sufficient to rebut any *prima facie* obviousness considered by the Office to be supported by the prior art.

A notice of allowability of the application is believed to be in order and is respectfully solicited.

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension may be charged to our Deposit Account No. 111833.

In the event any additional fees are required, please also charge our Deposit Account No. 111833.

Respectfully submitted,  
KUBOVCIK & KUBOVCIK



Ronald J. Kubovcik  
Reg. No. 25,401

Atty. Case No. SEI-142-133  
The Farragut Building  
Suite 710  
900 17th Street, N.W.  
Washington, D.C. 20006  
Tel: (202) 887-9023  
Fax: (202) 887-9093  
RJK/jbf

Attachment: Declaration under 37 C.F.R. § 1.132 of Akira  
TAKAHASHI